

CALCIUM CARBONATE IN TOPSOIL (NEUTRALIZATION POTENTIAL OF TOPSOIL)

(An Arizona Method)

SCOPE

1. (a) This test method is used to determine the acid-consumption capacity or alkalinity of a topsoil as defined by the conditions of the test itself. The principal mineral components of the topsoil which give rise to this alkalinity are generally taken to be alkali and alkaline earth metal carbonates. They are represented by calcium carbonate, the most abundant member of the group.

(b) This test method may involve hazardous material, operations, or equipment. This test method does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user to consult and establish appropriate safety and health practices and determine the applicability of any regulatory limitations prior to use.

(c) See Appendix A1 of the Materials Testing Manual for information regarding the procedure to be used for rounding numbers to the required degree of accuracy.

(d) Metric (SI) units and values are shown in this test method with English units and values following in parentheses. Values given for metric and English units may be numerically equivalent (soft converted) for the associated units, or they may be given as rounded or rationalized values (hard converted). Either the metric or English units along with their corresponding values shall be used in accordance with applicable specifications. See Appendix A2 of the Materials Testing Manual for additional information on the metric system.

APPARATUS

2. Requirements for the frequency of equipment calibration and verification are found in Appendix A3 of the Materials Testing Manual. Apparatus for this test procedure shall consist of the following:

(a) 150 mL beaker, tall form.

- (b) 50 mL, volumetric pipette, accurate to ± 0.05 mL.
- (c) A balance or scale capable of measuring the maximum weight to be determined and conforming to the requirements of AASHTO M 231, except the readability and sensitivity of any balance or scale utilized shall be at least 0.001 gram.
- (d) Filter paper equivalent to Whatman No. 43.
- (e) Filtration funnel, 7.5 cm, 60°, long stem.
- (f) 300 mL beaker, tall form, graduated.
- (g) 50 mL burette, accurate to ± 0.01 mL.
- (h) Stirring rod.

REAGENTS

- 3. (a) 1.000 ± 0.005 Normal Hydrochloric Acid Standard Solution.
- (b) 1.000 ± 0.005 Normal Sodium Hydroxide Standard Solution.
- (c) Phenolphthalein Indicator (1% Phenolphthalein in 50% Isopropyl Alcohol).

PROCEDURE

- 4 (a) Weigh 2.000 ± 0.001 gram of soil passing a 1.70 mm (No. 12) sieve into a 150 mL beaker.
- (b) Pipette 50.0 ± 0.05 mL Hydrochloric Acid into the 150 mL beaker.
- (c) Stir thoroughly with a stirring rod.
- (d) Let the mixture stand 15 minutes, or, if significant bubbling is observed, 30 minutes.
- (e) Filter the entire contents of the 150 mL beaker into a 300 mL beaker and rinse three times, being careful to keep total volume at or under 100 mL.

(f) Dilute to 100 mL, if necessary, with demineralized water, and add one drop of Phenolphthalein Indicator.

(g) Titrate with Sodium Hydroxide to a Phenolphthalein endpoint.

(h) Record the volume of Sodium Hydroxide titrated, in mL, as "V".

CALCULATIONS AND REPORT

5. (a) Calculate Calcium Carbonate, in percent, using the following formula:

$$\text{Calcium Carbonate} = 2.5 (50 - V)$$

(b) Report Calcium Carbonate to the nearest 0.1%.